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Co-creating a tailored public health intervention to reduce older adults' sedentary behaviour

Calum F Leask[a], Marlene Sandlund[b], Dawn A Skelton[a], Sebastien FM Chastin[a,c] on behalf of the GrandStand Research Group

[a]School of Health and Life Sciences, Institute of Applied Health Research, Glasgow Caledonian University, UK
[b]Department of Community Medicine and Rehabilitation, Umea University, Sweden
[c]Department of Movement and Sports Sciences, Ghent University, Belgium

Abstract

Objective: The increasing healthcare costs associated with an ageing population and chronic disease burden is largely attributable to modifiable lifestyle factors that are complex and vary between individuals and settings. Traditional approaches to promoting healthy lifestyles have so far had limited success. Recently, co-creating public health interventions with end-users has been advocated to provide more effective and sustainable solutions. The aim of this study was to document and evaluate the co-creation of a public health intervention to reduce sedentary behaviour in older adults.

Design: Community-dwelling older adults (N=11, mean age=74 years) and academic researchers attended 10 interactive co-creation workshops together.

Setting: Workshops took place on university campus and the co-creators completed fieldwork tasks outside the workshops.

Method: Workshops were informed by the Participatory Appreciative Action and Reflection methodology. Data were collected using field notes, video recording and worksheet tasks. Analysis was conducted using a qualitative content analysis approach.

Results: The co-creators developed a tailored intervention delivered through a mode congruent with older adults' lives. Key elements of the intervention included: 1) education on sedentary behaviour; 2) resources to interrupt sedentary behaviour; 3) self-monitoring; 4) action planning; 5) evaluating the benefits of interrupting sedentary behaviour.

Conclusion: Co-creation is a feasible approach to develop public health interventions; however is limited by the lack of a systematic framework to guide the process. Future work should aim to develop principles and recommendations to ensure co-creation can be conducted in a more scientific and reproducible way. The effectiveness and scalability of the intervention should be assessed.

Keywords

Sitting, Older adults, Physical activity, Intervention, Co-creation. Sedentary behaviour

Corresponding author:

Calum Leask, School of Health and Life Sciences, Institute of Applied Health Research, Glasgow Caledonian University, Cowcaddens Road, Glasgow, G4 0BA, UK.
Email: calum.leask@gcu.ac.uk

Introduction

There is increasing pressure on society to deal with additional healthcare costs associated with an ageing population and chronic disease burden (Hallal et al., 2012). This burden is largely attributed to modifiable lifestyle factors (National Institute for Health and Clinical Excellence, 2007), including physical inactivity (World Health Organisation, 2010) and poor nutrition (Finegood et al., 2008). These detrimental health behaviours have recently been defined as "wicked" problems which are complex and therefore, difficult to understand and problematic to solve (ACU Public Policy Institute, 2011).

Public health interventions targeting these lifestyle behaviours are usually developed using a top-down approach and created in isolation from end-users. These interventions are designed following reductionist theoretical principles about behaviour change thought to be applicable to all populations. Recently, more attention has been paid to tailoring the mode of intervention delivery, which is defined as implementing strategies for individual or group needs (Rimer and Kreuter, 2006). However, due to the complex variance of lifestyle between individuals and settings (Finegood et al., 2011), tailoring the mode of delivery may not be enough to sufficient address these "wicked" problems.

One advocated and promising way to develop effective interventions to tackle these problems is to combine solution-based and theory-based approaches, characterised by considering individuals' interests, forming cooperative teams of stakeholders and distributing actions and decisions (Finegood et al., 2011). It is thought that involving end-users in the development of solution-based interventions using key elements derived from participatory methodologies (including Participatory Health Research (International Collaboration for Participatory Health Research (ICPHR), 2013), Meta-design (Fischer and Giaccardi, 2006) and Citizen Science (King et al., 2016; Raddick et al., 2010)), may increase the likelihood of producing sustainable change (Green et al., 1996). Emergent from the participatory design paradigm is a process called co-creation (Sanders and Stappers, 2008), which is hypothesised to have a strong and enduring impact on health outcomes (Greenhalgh et al., 2016). Co-creation has been used successfully in healthcare service development (Elg et al., 2012) and may be a promising strategy to adopt to address other complex health behaviours.

One emerging health behaviour that has recently been identified as a public health priority is sedentary behaviour (Owen et al., 2010). Prolonged sedentary behaviour is detrimental to physical (Chastin et al., 2015) and mental (Teychenne et al., 2010) wellbeing and this growing evidence has resulted in several countries specifically issuing recommendations to reduce sedentary time across the life course as part of their national physical activity guidelines (Department of Health, 2011; World Health Organisation, 2010). Older adults are the most sedentary segment of society (Harvey et al., 2013) and sedentary behaviour is an independent risk factor of successful ageing, regardless of how physically active an individual is (Dogra and Stathokostas, 2012). As sedentary behaviour is ubiquitous throughout the day (Sartini et al., 2015), interventions need to modify the daily routine. Therefore, these interventions should be tailored to an individuals' context (Leask et al., 2015) and circumstances to improve adherence (Martin et al., 2005). Co-creation has been recommended as an approach to develop such interventions by working with older adults to ensure developed solutions are congruent with their daily lives (Leask et al., 2016). However, it has not been investigated whether it is possible to co-create interventions of this nature with older adults and subsequently produce a viable outcome.

The aim of this study was to co-create a tailored public health intervention to reduce sedentary behaviour in older adults.

Methods

Study design

A Participatory Appreciative Action and Reflection methodology was utilised, which is a third generation Action Research process that focuses on the strengths and successes of existing positive health traits in order to better understand and augment them (Ghaye et al., 2008). This methodology informed a series of interactive co-creation workshops that took place on the university campus between older adult volunteers and academic researchers to collaboratively develop a tailored intervention to facilitate the identification and reduction of older adults' prolonged sedentary periods. There were 10 interactive workshops conducted between May 2015 – February 2016 and each workshop lasted a maximum of 2 hours (Table 1). Between workshops, research fieldwork tasks were completed and used as tools for discussion in the following workshops. Examples of these tasks included interviewing peers and gathering printed media images portraying sitting in different contexts, a task used in previous participatory projects (Sandlund et al., 2014). Prototypes of intervention elements were created throughout the process and tested outside the workshops, allowing for any shortcomings or improvements to be identified and improved (Butterly Works, 2014). This was an iterative process (Plattner et al., 2011), as particular prototypes and discussions occurred over several workshops as they evolved over time and subsequently adapted, known in meta-design as seeding (Fischer and Giaccardi, 2006). Ethical approval was gained from the Glasgow Caledonian University School of Health and Life Sciences Ethics Committee.

Participants

Eleven community-dwelling older adult volunteers and 4 university researchers (who had expertise in the fields of Participatory Appreciative Action and Reflection, ageing, sedentary behaviour and behaviour change theory) formed the "GrandStand Research Group[1]" and will be referred to collectively as the co-creators. The older adults were aged >65 years and recruited from the Glasgow Caledonian University Older Adult Research Database. Inclusion criteria were: 65+ years of age, community dwelling, able to ambulate independently, able to give informed consent and able to attend a minimum of 5 workshops. Information packs were circulated by postal letter, including participant information sheets and a declaration of interest form. Informal telephone interviews were conducted with those who declared an interest and following their responses to a set of questions (for example: *"Are you comfortable voicing your opinion in a group?"*), 11 older adults were recruited who covered a range of the demographic criteria. Demographic information collected included: age, gender, number of falls in the past 12 months, number of medications and time spent in numerous sedentary activities in different contexts (Seniors Understanding Sedentary

[1] The name "GrandStand" was derived from a combination of the prefix "Grand" relating to the generation of older adults (i.e. grandparents), and "Stand" relating to the purpose of the project being to break up sedentary periods.

Patterns daily sedentary behaviour questionnaire (Medical Research Council, 2014)). All participants gave written informed consent.

Co-creation workshops

A semi-structured outline of the content for each workshop was created by reviewing the literature to understand the underpinning theoretical perspectives and important elements of co-creation, along with consulting experts on previous participatory projects. The rationale for using a semi-structured outline was informed by Meta-Design, which recognises that the needs of the end-user may change over time, therefore cannot be forecast in advance (Fischer and Herrmann, 2011). Subsequently, the proposed structure for each workshop should not be static and may evolve based on the discussions in each workshop. The actual content of each workshop is visible in Table 1 and 3 components emerged as being potentially beneficial to embed within this co-creation process:

Clearly highlighting the rules of participation and the aim of the workshops – The overall aim of the process and the aim of each workshop was stated and agreed at the beginning of each workshop, as undefined and broad aims may jeopardise the success of co-creation processes (Greenhalgh et al., 2016). The purpose of highlighting the rules of participation was to manifest ownership. All members assumed the role of co-researchers and were informed of their responsibility to invest their time and ideas. Ownership may arise when an individual exercises their responsibilities towards generating and utilising knowledge (Ghaye et al., 2008) and, whilst ownership has been identified as central in successful co-creation (Pater, 2009), it is currently underutilised (Mehrpouya et al., 2013). Ownership was reinforced by creating and branding the research group to foster a sense of belonging (Asatryan and Oh, 2008).

Building individual capacity by upskilling Co-creators – the older adults were upskilled by the academic researchers on concepts such as behaviour change theory. Knowledge sharing such as this can enhance creative performance when developing something new (Kristensson et al., 2004) and may enhance the capability of end-users (Baranick et al., 2015).

Presenting results of previous research and reviewing current scientific evidence – the academic researchers presented information on published research, for example data on when, where and why older adults are sedentary (Leask et al., 2015). This is one example of resource sharing (Allen et al., 2009), which can be useful to ensure individual circumstances are addressed in order to co-create a tailored (Zwass, 2010) and valuable outcome (Prahalad and Ramaswamy, 2004).

<insert Table 1>

Data collection

Data were collected using video recording, worksheet tasks and in-depth field notes for continued member checking (Carlson, 2010). This included a brief summary of the topics

discussed in the previous workshop to ensure an accurate version of events had been captured.

Data analysis

Qualitative content analysis of the discussions was utilised as the aim was to categorise what elements would be central in an intervention to identify and reduce sedentary behaviour in older adults. Once the workshops were completed, video recordings were re-examined three times and analysis was conducted on extensive field notes taken during these examinations. Using recordings for data analysis has been recommended as the researchers are provided the opportunity to review data uncontaminated by their prior assumptions (Silverman, 2000). The analysis took on a multi-phase approach: setting the research question; choosing the material; building a coding frame: divide data into units of code; using and adapting the coding frame; main analysis; interpretation and presentation of findings (Schreier, 2012). The findings were cross-referenced by 2 authors (CL, SC) until full agreement was reached. Disagreements were settled by conferring with the other co-authors (DS, MS). The process was evaluated by member-checking the findings throughout the process, including summarising discussion points, providing compiled reports of the previous workshop and producing a final prototype to ensure the findings were representative of the co-creators opinions and experiences (Kitzinger and Barbour, 1999).

Results

GrandStand older adult demographics

The 11 older adults (5 men), had an average age of 74 years (range: 66 – 82) (Table 2). The most common self-reported sedentary domains were time spent watching TV (average 2.8 hours per day) and eating (2.6 hours per day) (Table 2).

<insert Table 2>

Co-created Intervention

The co-creators developed “Are you up for it?”, an intervention containing 5 key elements delivered through a mode congruent with older adults’ daily life.

Mode of delivery - The mode of delivery chosen was to integrate the intervention through a daily diary, as most of the older adults already used a daily diary and therefore, an intervention which was an extension of an object they used every day was regarded as the lowest burden and most effective solution.

Key elements - The 5 key elements that the co-creators decided would be crucial to include in the intervention were: 1) *education of sitting*, such as the benefits / drawbacks of being sedentary; 2) *resources to interrupt sedentary behaviour*, which were defined and categorised as “Assets”, such as “things I feel”; 3) *self-monitoring* sedentary time throughout the diary; 4) *action planning* to identify when and how to reduce sedentary periods; 5) *evaluation* of the benefits of interrupting sedentary time more often (Table 3). Characteristics of the intervention that were tailorable to end-user preferences were: the

paper size of the intervention, frequency of action planning, assets most frequently used and sedentary behaviours deemed modifiable based on the context. The co-creators wanted the language to be simple, humorous and to "explain the journey". A logic model (Cooksy et al., 2001) was generated to explain the mechanism of the co-created intervention that will be trialled in the future (Figure 1).

<insert Figure 1>

Education of sedentary behaviour – The co-creators decided that an educational component was important to include at the beginning of the intervention, as not all older adults are aware of the health outcomes associated with sedentary behaviour. For example, the co-creators recognised that not everyone was aware that reducing sedentary time can improve health and interrupting sedentary periods more frequently could enhance wellbeing. The co-creators agreed that older adults would not be inclined to reduce their sedentary time if they did not understand the benefits associated with this. Therefore, two important characteristics to include in this education component were to highlight the drawbacks of sedentary behaviour, in addition to highlighting the positives of interrupting sedentary periods. However, the co-creators also knew that demonising sedentary behaviour may act as a deterrent to using the intervention. Consequently, they wanted the intervention to emphasise that some sedentary periods are beneficial, including rest and reading.

Resources to interrupt sedentary behaviour – The co-creators wanted to incorporate a simple solution into the intervention to help users interrupt sedentary periods. The solution chosen was to use what older adults already do to interrupt sitting, collectively defined as "Assets". As these assets were resources GrandStand older adults already used, this ensured that this solution was congruent with their daily routine, as opposed to interfering with it. To reflect users' daily living experience and ensure their usability, the co-creators were unanimous that the intervention should categorise and define the assets identified (Table 3). Depending on the context of users' sedentary periods and their daily routine, these assets could be used in different situations to interrupt sedentary periods, such as using the "prepare things for tomorrow" asset at night before bed. The categories of assets the co-creators defined were: 'things I do', 'things I feel' and 'things I don't control'. The co-creators wanted these categories, with examples of each asset, at the beginning of the intervention, with a glossary of all the assets identified at the back, which could be referred to at any time.

<insert Table 3>

Self-monitoring – The co-creators felt it was important for users to self-monitor their sedentary time to increase awareness of how long they sit during the day and ensure changes made to their sedentary behaviour would be congruent with their daily life. This was validated by co-creators during fieldwork tasks, for example developing a prototype to identify sedentary periods and redeveloping this through multiple iterations of testing and refining. It was decided that the mode of delivery of the self-monitoring element should be a daily diary, as most of the older adults already used a diary, therefore incorporating an intervention into an object they already used would ensure it was in-keeping with their daily routine. In addition, the co-creators felt that the intervention should not be prescriptive on

the frequency of use; therefore a diary format would provide the user with autonomy regarding how often they would self-monitor their sedentary time. The co-creators defined three important pieces of information to monitor: 1) the longest sedentary periods across the morning (from waking up – having lunch), afternoon (from having lunch – having their evening meal) and evening (having their evening meal – going to bed); 2) the purpose of their prolonged sedentary periods; 3) the reasons they interrupted those prolonged bouts (using the Assets previously defined). These were considered important to monitor to provide users with contextual information about their sedentary behaviour, which would be useful to identify when and why they are likely to be sitting for prolonged bouts.

Action planning – The co-creators were unanimous that following a period of self-monitoring sedentary time, the natural next step for users to try and reduce some of the prolonged sedentary periods they had identified was by goal-setting. It was agreed that only the 2 longest sedentary bouts identified should be considered to be interrupted, as the co-creators wanted to ensure the goal-setting process would be of low burden of users and therefore, make changes easier to sustain. However, to suit the preferences of all users, the co-creators felt it was crucial for users to decide whether they were willing to interrupt prolonged sedentary periods. For example, it was acknowledged that sedentary periods requiring attention (for example booking a holiday) or integral components of daily living (for example resting), were valued should not be interrupted. Therefore, the co-creators decided that catering for all users' unique circumstances by allowing them to decide which sedentary periods were modifiable, would be the best strategy to ensure sustainable change.

Evaluation – It was agreed that users should have the opportunity to document the benefits they experienced from interrupting sedentary periods more frequently. The co-creators concurred that this was crucial towards ensuring long-term adherence if the user was able to record that increased sedentary interruptions was positively effecting their wellbeing. Furthermore, the co-creators felt it was important to provide examples of positive health effects the user may be experiencing as this may differ between individuals, such as feeling physical (for example less stiff) or psychological benefits (for example feeling happier).

Tailorable characteristics

Characteristics of the intervention that were embedded within the intervention design included the frequency of action planning, assets most frequently used and the sedentary periods which users' deem modifiable. Further information on tailoring is available as supplementary material.

Older adults' experience of the co-creation process

Overall, the older adults responded positively about engaging with the process and commented on embedding the strategies identified here into their daily lives to sit less frequently. They were keen that the intervention was trialled for effectiveness and

suggested outcomes that they believed would be meaningful to older adults. Further information is available as supplementary material[2].

Discussion

This is the first study, to our knowledge, to use co-creation to develop an intervention with older adults to reduce sedentary behaviour. After 10 workshops, the co-creators successfully developed an intervention which is tailored to end-users' preferences and is congruent with their daily life.

The developed intervention appears to be logical. The co-creators developed an intervention which was an extension of what the older adults already used (a daily diary), something which is coherent with their daily routine. As sedentary behaviour is ubiquitous (Sartini et al., 2015) throughout the day and recommendations have been made that interventions need to modify the daily routine (Chastin et al., 2014; Greenwood-Hickman et al., 2015), this mode of intervention seems to make sense. In addition, all of the key elements in the intervention, such as education (Nutbeam, 2000), self-monitoring (Cohen et al., 2013) and action planning (Pearson, 2012), have been acknowledged in the literature as important theoretical constructs towards successful behaviour change.

There are several components that make this co-created intervention unique. Firstly, the intervention in this single form is dynamically tailored by design, allowing each end-user full autonomy regarding when and how to interrupt sedentary periods, in addition to accounting for changes in their context and circumstances over time. As such, this intervention will require minimal involvement from healthcare systems to implement. Further, as prolonged sedentary behaviour is essentially a time management issue, the platform chosen by the so-creators on which to embed the intervention (a daily diary) may be a valuable strategy to address this. Therefore, this may show greater effectiveness and adherence over time compared to traditional top-down developed interventions, which often prescribe large disruptions in participants' routines that may not be sustainable.

The co-creators incorporated some novel concepts into the developed intervention, such as using the reasons and activities of daily living that they already do as tools to interrupt sedentary periods, collectively defined as Assets. One theoretical perspective which may facilitate the understanding of this rationale is salutogenesis (Antonovsky, 1996), which stipulates that individuals possess a positive inherent capacity to enhance desirable health behaviours. Similar to the assets identified here, salutogenic theory specifies that generalised resistance resources are used as tools by individuals to enhance health, including physical, emotional and interpersonal-relational resources (Antonovsky, 1996). Interesting, two of the categories of assets classified by the co-creators mirror the resources identified by Antonovsky: the 'things I feel' category contained emotional (such as *improve mood*) and physical (such as *reduce soreness*) assets, whilst the 'things I don't control' category only contained interpersonal-relational assets (such as *friend support*). Using an asset-based approach due to its coherence with an individuals' life has been advocated as an effective health promotion approach to utilise (Antonovsky, 1996) and may be a simple yet effective solution to improve health at the individual level.

The older adults were keen to engage in the co-creation process. Despite conducting 10 workshops, there was a 100% retention rate over the 9 month period, with the co-

[2] Supplementary material can be accessed online alongside the full-text of this article

creators making considerable adjustments to their own routines to attend. Previous research has shown the benefit of recruiting older adults for participatory projects due to their high rates of adherence (Carrasquillo and Chadiha, 2007). One reason for this could be due to the manifestation of ownership during the process, which was evident in situations such as one co-creator spontaneously writing a poem to define the intervention itself. Ownership can help enable creativity (Harwood and Garry, 2013) and facilitate knowledge production (Cook, 2012) in co-creation, therefore it appears that part of the successful engagement of older adults is attributed to them feeling ownership in the intervention they co-created.

There are other important aspects that may have contributed to the success of the co-creation process. Whilst there was a carefully detailed and agreed aim throughout to ensure the scope of the workshops was not too broad (Greenhalgh et al., 2016), the structure within the workshops was flexible (Caro et al., 2016) to allow for topics to be fully explored, particularly those which emerged from discussion that were not originally scheduled. Furthermore, the co-creators exercised engaged empowerment (Israel et al., 2001) during fieldwork tasks by collecting data and presenting this at the following workshop, which facilitated each co-creators perceived control on the process (Fischer and Giaccardi, 2006). In addition, the sample size of GrandStand older adults fell within previous recommendations for focus group studies (Onwuegbuzie and Collins, 2007). The interactive tasks during co-creation process are similar to those in focus group studies, whereby high quality discussions are crucial towards a successful process (Prahalad and Ramaswamy, 2004) and, by engaging 11 older adults, this allowed for interactive tasks to be conducted in smaller groups before being discussed by all co-creators. To enhance group communication, a new seating plan was developed each week, which ensured new interactions between the co-creators.

There are some limitations to consider. The older adults often stated that they were not as sedentary as the 'typical' older adult, despite their high self-reported sedentary time (14.2 hours). Second, the sample was predominantly older old adults (mean age = 74 years). Therefore, this intervention may not be necessarily applicable or representative to other younger and less sedentary old adults; however the co-creators considered and conversed with other older adults out-with the workshops to ensure the intervention could be beneficial for as many people as possible. Additionally, due to the small sample size, this intervention may not be generalisable for the larger population, although the sample contained a wide demographic variety, including time spent sedentary and medical conditions. Further, there is limited literature discussing co-creation governance (Greenhalgh et al., 2016) and the process was hindered by a lack of a systematic framework in the literature to ensure co-creation is conducted in a scientific and reproducible way. Therefore, developing guidelines on how to conduct and report these approaches are needed. Finally, as this intervention has yet to be trialled, its effectiveness needs to be tested. However, the logic model presented in Figure 1 shows the mechanism of how the intervention may work and is supported by recognised behaviour change theories.

This study provides one example of a co-created public health intervention by working with end-users to develop a tailored intervention to reduce sedentary behaviour in older adults. Co-creation appears to be a feasible approach to intervention development but is currently limited by the lack of a systematic framework to ensure the process is scientific and reproducible. Future work should aim to develop principles for conducting and reporting these approaches which can then be applied to other participatory public

health intervention development projects. In addition, this intervention needs to be trialled to assess its effectiveness.

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Declaration of conflicting interests

The authors declare no conflicts of interest.

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Table 1. Overview of co-creation workshop content.

Workshop Number	Key discussion points / focus	Fieldwork tasks
1	Introductory ice breaker tasks Presentation of participation rules Presentation and discussions to raise awareness of the health implications of SB	Gather printed images from the media to understand media portrayal of SB.
2	Presenting research of how older adults interrupt their SB Select most relevant strategies to interrupt SB Discuss the value of SB	Identify additional strategies to break up SB
3	Discuss fieldwork task from Workshop 2 Present research on the context of SB Discuss the value of SB in different contexts	Identify the context of your longest sitting period
4	Discuss fieldwork task from Workshop 3 Discuss strategies to identify sitting time Discuss how to present strategies to interrupt SB	Create case studies of individuals who may find it hard to change their sitting patterns
5a*	Discuss fieldwork task from Workshop 4 Discuss self-monitoring SB Discuss how to present strategies to interrupt SB	Pilot test awareness raising SB tool
5b*	Fieldwork task from Workshop 4 Task: discuss self-monitoring SB Discuss how to present strategies to interrupt SB	Pilot test awareness raising SB tool
6	Discuss how to present strategies to interrupt SB Discuss pilot testing results Discuss action planning	Presentation of strategies to interrupt SB
7	Discuss key elements of prototype	Action planning

	Discuss fieldwork task from Workshop 6 Present first completed prototype	
8	Discuss fieldwork task from Workshop 7	Use the prototype
9	Feedback from first prototype	None

SB = sedentary behaviour. * Workshops 5a and 5b were the same outline but conducted on 2 separate occasions due to other co-creator commitments.

Table 2. Older adult demographics and sedentary behaviour recall questionnaire scores.

Participants	*Gender*	*Age*	*Medications*	*Falls in last 12 months*	*Watching TV (h/day)*	*PC for work (h/day)*	*PC for leisure (h/day)*	*Read for leisure (h/day)*	*Listening to music (h/day)*	*Hobbies (h/day)*	*Socialising (h/day)*	*Eating (h/day)*	*Self-care (h/day)*	*Household tasks (h/day)*	*Rest (h/day)*	*Total (h / day)*
1	F	77	7	1	6	0	1.92	1	1	1.5	1	3	1.25	1.08	0	17.75
2	F	72	0	0	2	0	0	1.5	1	2	1.5	2.5	1	0	0	11.5
3	F	78	10	1	0.5	0	1	2	0.5	0.5	4.5	5	2	2.5	1.5	20
4	F	66	0	0	0.75	1.5	0.25	0.5	0	0	1.5	2	1	0.25	0.5	8.25
5	M	72	0	0	2.75	0	1.75	2.17	2.25	0	0	3	2.42	1	0	15.34
6	M	68	5	0	1.5	0	0	1.5	0	0	0	0.5	0.5	0.25	0	4.25
7	F	78	4	0	5	0	2	1	0	5	0.5	3	1.5	3	0.5	21.5
8	M	67	12	1	3.5	0.5	2	0.5	1	1	2	1.5	0.5	0.25	1	13.75
9	M	74	0	0	1	2	0.5	0.5	0	0.5	0.5	1.75	0.25	0	0	7
10	F	80	6	0	6	0	0	3	0	2	4	2.5	1.5	0	1	20
11	M	82	14	0	5	0	0	1	3	0	6	1	2	0.5	0.5	19
Average		74	5	0	2.8	0.3	1.1	1.3	0.7	1.3	1.4	2.6	1.3	1	0.4	14.39
SD		5.5	5.1	0.5	2.1	0.7	0.9	0.8	1.0	1.5	2.0	1.2	0.7	1.0	0.5	5.92

SD = Standard Deviation.

Table 3. Typology of older adults' asset categories and descriptions.

Category	*Assets*	*Description*
Things I feel	A good stretch	*"Stand up and reach for the sky"*
	Curiosity	*"What's that bird on the tree outside?"*
	Feeling energetic	*"Find something that gets you moving (walking / ironing / doing the washing)"*
	Guilt of sitting	*"Develop a to do list and cross off as you do things in a day"*
	Happiness	*"Stand up if you are happy / or to feel happy"*
	Improve circulation	*"Walking in short bursts can improve circulation"*
	Improve mood	*"Stand up and you could help improve your mood"*
	Knowing positives of breaking sitting Reduce soreness	*"Standing up is good for me, I'll try and do it hourly"* *"When feeling sore, head for the door"*
	Reduce stiffness	*"The less I sit, the less stiff I get"*
	Stop falling asleep	*"Nodding off during the day? Stand up and don't delay!"*
Things I do	Chores (DIY / housework)	*"Washing up and cleaning up should be done standing up"*
	Exercise at home	*"To feel a bit fitter walk up and down a flight of stairs"*
	Exercise class	*"Find an exercise class and make / meet some friends"*
	Finish course of meal	*"Interrupt a meal to refill glass of water"*
	Finish meal	*"Clear the table and wash the dishes"*
	Gardening	*"Don't water all plants at once, do it in stages"*
	Getting a drink	*"Eg. during TV adverts"*
	Prayer	*"Get out your chair to pray"*
	Prepare meals	*"Stand up when peeling the vegetables"*
	Prepare things for tomorrow	*"Break up sitting in the evening by preparing items for breakfast"*
	Shopping	*"Go for a stroll, bring back a roll"*
	Taking medication	*"Don't leave medication next to your seat"*
	Stand to read	*"Stand up at the end of each chapter"*

	TV adverts	*"Time for a coffee break"*
	TV programme finish	*"At the end of a TV show, get up and do something"*
	Visit nearby park	*"If the weather is good, take a stroll in the wood"*
	Visit other rooms	*"Check the windows and doors, especially in the evening"*
	Walk grandchildren to school	*"Get out, be more active!"*
Things I don't control	Answer the door	*"Schedule visitors for when you sit for long periods"*
	Family encouragement	*"Find a family member to encourage you to stand"*
	Friend encouragement	*"Find a friend to encourage you to stand"*
	Stand up to answer the phone	*"Don't keep your house phone next to your chair"*
	Pet responsibility	*"It should never be a slog to exercise your dog"*